COMMENTS AND RESPONSE

In view of the comments below, Applicants respectfully requests that the Examiner

reconsider the present application including rejected claims, as amended, and withdraw the claim

rejections.

Claim Rejections 35 USC § 103

The Examiner has rejected claims 1-6, 12-17, 19-25, 31-49, 55-61, 63-77, and 83-88

under 35 U.S.C. § 103(a) as being allegedly unpatentable over United States Patent No.

6,437,832 to Grabb et al. ("Grabb"), in view of United States Patent No. 6,356,157 to Kawamura

("Kawamura"). Applicant respectfully traverses this rejection.

Regarding claims 1, 20, and 36, the circuit disclosed in Grabb, an overlay sequence

generator 109 generates a replica of a transmitted ultra wide-band overlay sequence signal,

synchronized to the received overlay sequence signal, and provides an output signal to the a

cross-correlator 108. The cross-correlator cross-correlates a received digital TV and overlay

signals against a locally-generated signal from the generator 109. The output of the cross-

correlator 108 is fed to the phase adjustor which adjusts the phase of the locally generated

overlay signal by retarding or advancing the clocking of the locally generated overlay signal to

maximize the largest peak of the signal from the cross-correlator 108. (See, e.g., Grabb, column

4, line 66, through column 5, line 10, and Fig. 1.)

In contrast, claim 1 recites "comparing a parameter of the analysis result with a

predetermined threshold to produce a comparison result," and "shifting a phase of said receiver

signal when said parameter of said analysis result is beyond said predetermined threshold." As

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noted in the response filed on January 30, 2004, nothing in Grabb discloses or suggests these features.

In the current Office Action, the Examiner relies upon Kawamura to show these features. In particular, the Examiner notes that Kawamura discloses a phase lock loop in its figure 1. He then states that in Kawamura a signal is input to phase comparators, as is a feedback signal. The input signal is then compared to the feedback signal (which he asserts reads on the recited predetermined threshold) and when the signals are not equal, a phase correction is input to the charge pump 130. He notes that this includes when the input signal is beyond a predetermined threshold. He then concludes that it would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the PLL of Kawamura into the system of Grabb. Applicants respectfully traverse this assertion.

The system described in Grabb produces a cross-correlation result at the output of the cross-correlator 108. The phase adjustor 110 then adjusts the phase of the locally generated overlay signal by retarding or advancing the clocking of the locally generated overlay signal to maximize the largest peak of the signal from the cross-correlator 108.

In contrast, the phase locked loop (PLL) described in Kawamura receives two input signals, a feedback signal V_c and a reference signal V_f, performs a comparison of these two signals, and controls the frequency of an oscillation signal in accordance with the phase difference δ between the two input signals. In particular, the first and second digital phase comparators 110 and 120 in side the PLL 100 monitor the high level / low level transition points of the feedback signal V_c and the reference signal V_f, to determine a phase difference δ between them. (See, e.g. Kawamura, column 3, line 64, through column 4, line 44, column 5, line 48,

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through, column 6, line 31, and FIGS. 2A and 2B.) But phase difference is not the same as

magnitude, and any correspondence between the two should not be read into Kawamura.

There is nowhere in the relevant portions of Grabb where it would be appropriate to add

the PLL of Kawamura. The output of the cross-correlator 108 is not compared with another

signal to determine a phase difference between them. Rather, the phase adjustor 110 in Grabb

performs its phase adjustments in a manner to maximize the largest peak of the signal from the

cross-correlator 108. It would therefore not be appropriate to employ the PLL of Kawamura in

the phase adjustor 110 of Grabb. And even if the two were combined, the resulting circuit would

not operate as the Examiner suggests.

Thus, the Examiner has provided no motivation to combine the teachings of Kawamura

with those of Grabb. All that is provided in the rejection for such motivation is the assertion that

"it would have been obvious to one of ordinary skill in the art at the time of the invention to

incorporate the PLL of Kawamura into the system of Grabb," along with a reason that "this

would allow for a short locking time and a stable operation."

First, this is not accurate. While the PLL disclosed in Kawamura does provide for a short

locking time and a stable operation, it does so when it is comparing the phases of two input

signals and controlling the frequency of an output signal based on the absolute value of the

difference between the phases of the input signals. (See, e.g., Kawamura, Abstract.) As described

above, Kawamura does not disclose or suggest any means by which the phase of a signal is

controlled based on a cross-correlation value between two signals.

Second, it is not sufficient to maintain a rejection for the Examiner to simply identify

each claimed element in cited references. Rejecting claims based solely on the Examiner finding

corollaries for the claimed elements would permit the Examiner to use the claimed invention

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itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the

claimed invention. And such an approach is not permissible.

In order to prevent the use of hindsight based on the invention, the Examiner must show a

motivation to combine the cited elements – some reason that a skilled artisan confronted with the

same problems as the inventor and with no knowledge of the claimed invention would select the

elements from the cited prior art references for combination in the manner claimed. But it is not

sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote

invocation were sufficient to supply a motivation to combine, most areas of technology would

rarely experience a patentable technical advance. The requirement of a suggestion to combine

stands as a critical safeguard against hindsight analysis and rote application of the legal test for

obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation

to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the

motivation to combine the cited references.

Furthermore, even if the PLL disclosed in Kawamura were combined with the system

disclosed in Grabb, the combination would not operate properly. The phase adjustor 110 of

Grabb only has a single cross-correlation result input from the cross-correlator 108. It does not

receive any other signal that it can compare the cross-correlation result with. Even if the PLL in

Kawamura were used in the phase adjustor 110 of Grabb, it discloses nothing suggesting that a

predetermined threshold be used. And even if a predetermined threshold were used, the PLL

would not provide a proper phase-correcting signal to the wideband overlay sequence generator

109 because the PLL compares phase differences, and does not evaluate signal magnitudes.

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Claim 20 recites "a comparator configured to compare a parameter of the analysis result with a predetermined threshold to produce a comparison result," and "a phase shifter configured to shift a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold." As noted above with respect to claim 1, neither Grabb nor Kawamura, alone or in combination disclose or suggest the use of a predetermined threshold, nor do they disclose or suggest shifting a phase of a receiver signal when a parameter of an analysis result is beyond a threshold.

Claim 36 recites a "means for comparing a parameter of the analysis result with a predetermined threshold to produce a comparison result," and a "means for shifting a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold." As noted above with respect to claim 1, neither Grabb nor Kawamura, alone or in combination disclose or suggest the use of a predetermined threshold, nor do they disclose or suggest shifting a phase of a receiver signal when a parameter of an analysis result is beyond a threshold.

Claims 7-19 all ultimately depend from claim 1 and are allowable for at least the reasons given above for claim 1.

Claims 21-35 all ultimately depend from claim 20 and are allowable for at least the reasons given above for claim 20.

Claims 3 and 22 further recite that the predetermined threshold is a magnitude of the correlation. Nothing in Kawamura or Grabb disclose or suggest comparing a parameter of the analysis result with a predetermined magnitude of a correlation to produce a comparison result. Grabb discloses that the output of a cross-correlator is provided to a phase adjustor 110, and Kawamura discloses that first and second digital phase comparators compare the phases of a

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feedback signal and a reference signal. But nothing discloses or suggests that the circuit of either

document be modified to use a magnitude of a correlation as a threshold value.

The Examiner asserts that a signal inherently has a correlation value and is to be matched

with a feedback signal. However, whether or not a signal has a correlation value or not, nothing

in the PLL shown in Kawamura discloses using a magnitude of a correlation value as a threshold

value. Claim 3 includes the limits of claim 1, from which it depends, and claim 22 includes the

limits of claim 20, from which it depends. Therefore, claim 3 requires the step of comparing a

parameter of the analysis result with a predetermined magnitude of the correlation to produce a

comparison result. Similarly, claim 22 requires a comparator configured to compare a parameter

of the analysis result with a predetermined magnitude of the correlation to produce a comparison

result. Nothing in Kawamura or Grabb discloses or suggests such features.

Claims 4 and 23 further recite that the predetermined threshold is a predetermined signal

to noise ratio. Nothing in Grabb or Kawamura, alone of in combination, discloses or suggests the

use of such a threshold, as noted above.

The Examiner asserts that a signal inherently has an SNR value and is to be matched with

a feedback signal. However, whether or not a signal has an SNR value or not, nothing in the PLL

shown in Kawamura discloses using an SNR value as a threshold value. Claim 4 includes the

limits of claim 1, from which it depends, and claim 23 includes the limits of claim 20, from

which it depends. Therefore, claim 4 requires the step of comparing a parameter of the analysis

result with a predetermined signal to noise ratio to produce a comparison result. Similarly, claim

23 requires a comparator configured to compare a parameter of the analysis result with a

predetermined signal to noise ratio to produce a comparison result. Nothing in Kawamura or

Grabb discloses or suggests such features.

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Claims 5 and 24 further recite that the predetermined threshold is a predetermined bit error rate. Nothing in Grabb or Kawamura, alone of in combination, discloses or suggests the use of such a threshold, as noted above.

The Examiner asserts that a signal inherently has a bit error rate value and is to be matched with a feedback signal. However, whether or not a signal has a bit error rate value or not, nothing in the PLL shown in Kawamura discloses using a bit error rate value as a threshold value. Claim 5 includes the limits of claim 1, from which it depends, and claim 24 includes the limits of claim 20, from which it depends. Therefore, claim 5 requires the step of comparing a parameter of the analysis result with a predetermined bit error rate to produce a comparison result. Similarly, claim 24 requires a comparator configured to compare a parameter of the analysis result with a predetermined bit error rate to produce a comparison result. Nothing in Kawamura or Grabb discloses or suggests such features.

Claims 6 and 25 further recite that the predetermined threshold is a predetermined value of a lock parameter. Nothing in Grabb or Kawamura, alone of in combination, discloses or suggests the use of a threshold, as noted above.

The Examiner asserts that the combination he suggests would have the output of the cross-correlation input to the PLL, and that the signal would be matched with a feedback signal. He then asserts that if a match occurs, then phase lock has been achieved.

First, as noted above, it would be inappropriate and non-functional to combine the PLL of Kawamura with the circuit disclosed in Grabb. The PLL of Kawamura compares the phases of two input signals, while the phase adjustor 110 in Grabb receives a single cross-correlation signal. The two circuits are not compatible, there would be no motivation to combine them, and even if they were combined, they would not function as the Examiner asserts.

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Second, nothing in the PLL shown in Kawamura discloses using a value of a lock parameter as a threshold value. Claim 6 includes the limits of claim 1, from which it depends, and claim 25 includes the limits of claim 20, from which it depends. Therefore, claim 6 requires the step of comparing a parameter of the analysis result with a predetermined value of a lock parameter to produce a comparison result. Similarly, claim 25 requires a comparator configured to compare a parameter of the analysis result with a predetermined value of a lock parameter to produce a comparison result. Nothing in Kawamura or Grabb discloses or suggests such features.

With regard to claims 3-6 and 21-25, the Examiner simply notes inherent properties of the signals in his proposed combination. But he does not disclose any suggestion in Grabb or Kawamura that these properties be used in any comparison, and it is impermissible to read such a suggestion into the teachings of those documents. Just because a signal will have an inherent bit error rate or signal-to-noise value does not disclose or suggest using those parameters to set a threshold value.

Claims 13 and 32 further recite that the UWB signal comprises multilevel pulses. As defined in the specification (e.g., on page 7, lines 25-31), a multilevel signal is one that has multiple amplitude levels for various different pulses. It requires more than just binary values. For example, one embodiment of multilevel bi-phase signals is disclosed as having values of ($+1$, -1, $+a1$, $-a1$, $+a2$, $-a2$, ..., $+aN$, $-aN$), while one embodiment of multilevel multi-phase signals is disclosed as having values of ($a_i \exp(j2\pi\beta/N) \mid a_i \in \{1, a1, a2, ..., aK\}, \beta \in \{0, 1, ..., N-1\}$).

Nothing in Grabb or Kawamura disclose or suggests the use of multilevel pulses as defined in Applicants' specification. The portion of Grabb cited by the Examiner (Grabb, column 4, lines 30-45) simply discloses the use of binary levels. And as noted above, binary levels are not multilevel pulses, as defined in Applicants' specification.

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Claims 15-17 recite various operations that are performed based on whether the recited analysis result is beyond the predetermined threshold. Since neither Grabb nor Kawamura disclose or suggest the use of such a threshold, they likewise do not suggest performing functions based on whether such a threshold is met.

Furthermore, claim 17 recites using multiple thresholds, including an initial threshold and an extreme threshold, and changing the predetermined to the initial threshold when the changed predetermined threshold is beyond the extreme threshold. Even if Grabb and Kawamura were combined as the Examiner suggests, nothing in either document discloses or suggests the use of multiple thresholds or changeable thresholds.

Claim 35 recites a location mechanism configured to locate a first phase angle at which said parameter of the analysis result is beyond said predetermined threshold, and a phase scan range setting mechanism configured to define a phase scan range relative to said first phase angle. By using these features, the recited system can narrow down to a specific phase scan range by using a threshold determination. Nothing in Grabb or Kawamura, alone or in combination, discloses or suggests this feature. Even if Grabb and Kawamura were combined as the Examiner suggests, nothing in either document would teach locating a specific phase angle at which a threshold was met, and then defining a phase scan range relative to the specific located phase angle.

Claim 37 recites "analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result," "locating a desired phase angle within the phase range using the analysis result," and "shifting a phase of the receiver signal to the desired phase angle." In this way the recited system can more quickly achieve

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synchronization by examining less than an entire cycle of the code wheel. This feature is not

disclosed or suggested by Grabb or Kawamura, alone or in combination.

The Examiner acknowledges that Grabb does not disclose comparing the incoming signal

to a predetermined threshold and shifting the phase when the threshold is exceeded. For this the

Examiner relies upon the PLL in Kawamura. Applicants respectfully traverse this proposed

combination for at least the reasons given above with respect to claim 1.

In addition, Applicants respectfully traverse the Examiner's further assertion that all of

the elements recited in claim 37 are shown by Grabb and Kawamura since Kawamura will alter

the phase for a value less than 360 degrees since 360 degrees equals zero degrees and no phase

adjustment is necessary.

Claim 37 requires first locating a desired phase angle within a phase range less than 2π

radians, then shifting a phase of the receiver signal to the desired phase angle. Nothing in Grabb

or Kawamura discloses locating a desired phase angle within a phase range less than 2π radians.

Claim 37 requires that the number of available phase angles be limited to a specific phase range.

Neither Grabb nor Kawamura suggest such a restriction. Each appears to require that a phase

range of 360 degrees be used.

Again, simply asserting that the phase range *may* be shortened does not provide the

suggestion that it *should* be. As noted above, a missing element may not be established simply by

a probability or possibility. Therefore, for at least the reasons given above, the Examiner has

failed to set forth a prima facie case of obviousness with respect to claim 37.

Claims 38-64 all ultimately depend from claim 37 and are allowable for at least the

reasons given above for claim 37.

Claims 19 and 63 recite that determining a lock parameter comprises calculating

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$L = sign(m_1 - Ks_1)$, where wherein L is a lock parameter, m_1 is a first measurement of a signal-to-noise relationship, K is a constant value, and s_1 is a second measurement of a signal-to-noise relationship. Nothing in Grabb or Kawamura, alone or in combination, suggests this specific measurement of a lock parameter.

Claim 65 recites "an analyzer configured to analyze the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result," "a locator configured to locate a desired phase angle within the phase range using the analysis result," and "a phase shifter configured to shift a phase of the receiver to the desired phase angle." As noted above with respect to claim 37, the Examiner did not provide proper motivation to combine Grabb and Kawamura, and such a combination would be non-functional. In addition, neither Grabb nor Kawamura disclose or suggest analyzing an incoming UWB signal over a phase range less than 2π radians, and then shifting a phase of a receiver to a desired phase angle within the phase range.

Claims 66-87 all ultimately depend from claim 65 and are allowable for at least the reasons given above for claim 65.

Claim 88 recites a "means for analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result," "means for locating a desired phase angle within the phase range using the analysis result," and "means for shifting a phase of the receiver signal to the desired phase angle." As noted above with respect to claim 37, the Examiner did not provide proper motivation to combine Grabb and Kawamura, and such a combination would be non-functional. In addition, neither Grabb nor Kawamura disclose or suggest analyzing an incoming UWB signal over a phase range less than 2π radians, and then shifting a phase of a receiver to a desired phase angle within the phase range.

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Claims 39-43 and 67-71 all further limit the phase range (to less than π radians, less than $\pi/2$ radians, less than $\pi/3$ radians, less than $\pi/4$ radians, or less than $\pi/8$ radians). The Examiner asserts that any phase difference will be compensated for until phase lock occurs. But this is not the same as limiting the phase range. If 360 degrees are used to determine the proper phase, then whether it is constructively split up into groups or not, or whether a lower phase difference is compensated for is irrelevant. In reality, the entire 360 degrees (i.e., 2π radians) is used to determine the phase. And it would be improper to call this using a limited range, when it in fact is not limiting the range of phases at all.

Claim 45 recites using a threshold analysis result. As noted above with respect to claim 1, nothing in Grabb or Kawamura, alone or in combination, discloses or suggests the use of a threshold.

Claims 47 and 74 further recite that the analysis result comprises a bit error rate. Nothing in Grabb or Kawamura discloses or suggests locating a desired phase angle within a phase range using a bit error rate, for reasons comparable to those given above with respect to claims 5 and 24.

Claims 48 and 75 further recite that the analysis result comprises a signal to noise ratio. Nothing in Grabb or Kawamura discloses or suggests locating a desired phase angle within a phase range using a signal to noise ratio, for reasons comparable to those given above with respect to claims 4 and 23.

Claims 49 and 76 further recite that the analysis result comprises a lock parameter. Nothing in Grabb or Kawamura discloses or suggests locating a desired phase angle within a phase range using a lock parameter, for reasons comparable to those given above with respect to claims 6 and 25.

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With regard to claims 47-49 and 74-76, the Examiner is engaging in further speculation about what his suggested combination of Grabb and Kawamura *might* do, not what they are disclosed as doing. And it is impermissible for the Examiner to read teachings into a reference that are not there. For example, just because a signal will have an inherent bit error rate or signal-to-noise value does not disclose or suggest using those parameters to locate a desired phase angle within a phase range.

Claims 56 and 84 further recite that the UWB signal comprises multilevel pulses. As defined in the specification (e.g., on page 7, lines 25-31), a multilevel signal is one that has multiple amplitude levels for various different pulses. For example, one embodiment of multilevel bi-phase signals is disclosed as having values of $(+1, -1, +a1, -a1, +a2, -a2, ..., +aN, -aN)$, while one embodiment of multilevel multi-phase signals is disclosed as having values of $(a_i \exp(j2\pi\beta/N) \mid a_i \in \{1, a1, a2, ..., aK\}, \beta \in \{0, 1, ..., N-1\})$. Nothing in Grabb or Kawamura discloses or suggests the use of multilevel pulses, as defined in Applicants' specification. The use of bi-phase signals is not a multilevel signal as the term is defined in the specification.

Claim 57 recites "changing a value of said phase range," and "repeating said steps of comparing and shifting using the changed phase range." Just as with respect to claim 37, Grabb and Kawamura do not disclose using a phase range less than 2π radians, so too do they fail to disclose changing the values of such a phase range.

Claim 58 recites "scanning a phase range along a phase range vector to a vector maximum phase;" claim 59 recites "changing the vector maximum phase," and "repeating said step of scanning until said vector maximum phase is beyond a predetermined extreme vector maximum phase;" and claim 60 recites "reducing the vector maximum phase." Just as Grabb and Kawamura do not disclose using a phase range less than 2π radians, so too do they fail to

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disclose scanning along a phase range vector. And even if it did show scanning phases, it clearly

doesn't disclose changing a vector maximum phase, using an extreme vector minimum phase, or

reducing a maximum vector phase.

Therefore, based on at least the reasons given above, Applicant respectfully requests that

the Examiner withdraw the rejection of claims 1-6, 12-17, 19-25, 31-49, 55-61, 63-77, and 83-88

under 35 U.S.C. § 103(a) as being allegedly unpatentable over Grabb in view of Kawamura.

The Examiner has rejected claims 7-11, 26-30, 50-54, and 78-82 under 35 U.S.C.

§ 103(a) as being allegedly unpatentable over Grabb in view of Kawamura, and further in view of

United States Patent No. 6,239,741 to Fontana et al. ("Fontana"). Applicant respectfully

traverses this rejection.

Claims 7-11 depend from claim 1 and are allowable for at least the reasons given above

for claim 1. Claims 26-30 depend from claim 20 and are allowable for at least the reasons given

above for claim 20. Claims 50-54 depend from claim 37 and are allowable for at least the reasons

given above for claim 37. And claims 78-82 depend from claim 65 and are allowable for at least

the reasons given above for claim 65. Nothing in Fontana cures the deficiencies in Grabb and

Kawamura noted above.

In addition, claims 9, 28, 52, and 81 recite maintaining a substantially constant bit error

rate. Similarly, claims 10, 29, 53, and 82 recite obtaining a substantially constant noise in the

amplified incoming UWB signal. These features are not disclosed in Grabb Kawamura, or

Fontana, alone or in combination.

The Examiner notes that the combination of Grabb and Kawamura does not disclose

amplifying the received signal. And although Fontana does disclose low noise, high gain

wideband amplification, it does not disclose or suggest that either the bit error rate be kept

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constant or that the noise in an incoming UWB signal be maintained as substantially constant.

Although it is certainly *possible* for a device like Fontana to perform the functions that the

Examiner suggests, nothing in Grabb, Kawamura, or Fontana suggests that they actually be

performed. As a result, there is no motivation in Fontana to modify the proposed combination of

Grabb and Kawamura as the Examiner suggests.

Therefore, based on at least the reasons given above, Applicant respectfully requests that

the Examiner withdraw the rejection of claims 7-11, 26-30, 50-54, and 78-82 under 35 U.S.C.

§ 103(a) as being allegedly unpatentable over Grabb, in view of Kawamura, and further in view

of Fontana.

The Examiner has rejected claims 18 and 62 under 35 U.S.C. § 103(a) as being allegedly

unpatentable over Grabb in view of Kawamura, and further in view of United States Patent No.

5,841,808 to Rizzo et al. ("Rizzo"). Applicant respectfully traverses this rejection.

Claim 18 depends from claim 1 and is allowable for at least the reasons given above for

claim 1. Claim 62 depends from claim 37 and is allowable for at least the reasons given above

for claim 37. Nothing in Rizzo cures the deficiencies in Grabb noted above.

Therefore, based on at least the reasons given above, Applicant respectfully requests that

the Examiner withdraw the rejection of claims 18 and 62 under 35 U.S.C. § 103(a) as being

allegedly unpatentable over Grabb, in view of Kawamura, and further in view of Rizzo.

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